

Overview of NASARTI (NASA Radiation Track Image) program: highlights of the model improvement and the new results

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This presentation summarizes several years of research done by the co-authors developing the NASARTI (NASA Radiation Track Image) program and supporting it with scientific data. The goal of the program is to support NASA mission to achieve a safe space travel for humans despite the perils of space radiation. The program focuses on selected topics in radiation biology that were deemed important throughout this period of time, both for the NASA human space flight program and to academic radiation research. Besides scientific support to develop strategies protecting humans against an exposure to deep space radiation during space missions, and understanding health effects from space radiation on astronauts, other important ramifications of the ionizing radiation were studied with the applicability to greater human needs: understanding the origins of cancer, the impact on human genome, and the application of computer technology to biological research addressing the health of general population. The models under NASARTI project include: the general properties of ionizing radiation, such as particular track structure, the effects of radiation on human DNA, visualization and the statistical properties of DSBs (DNA double-strand breaks), DNA damage and repair pathways models and cell phenotypes, chromosomal aberrations, microscopy data analysis and the application to human tissue damage and cancer models. The development of the GUI and the interactive website, as deliverables to NASA operations teams and tools for a broader research community, is discussed. Most recent findings in the area of chromosomal aberrations and the application of the stochastic track structure are also presented.

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